Small Business Innovation Research/Small Business Tech Transfer

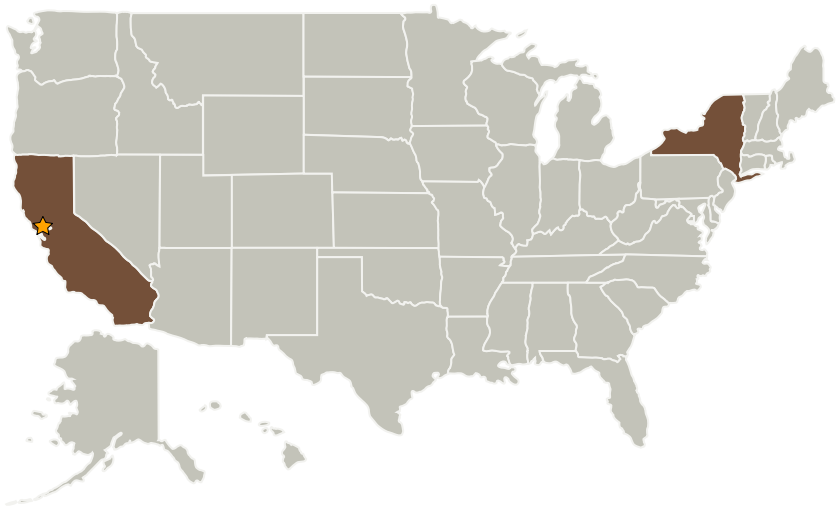
Integrating Prognostics in Automated Contingency Management Strategies for Advanced Aircraft Controls, Phase II

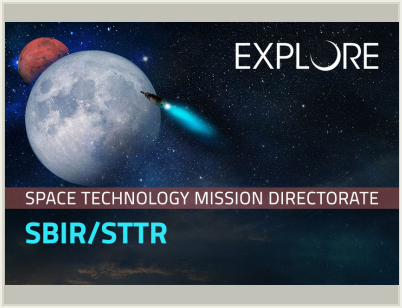
Completed Technology Project (2009 - 2011)

Project Introduction

Automated Contingency Management (ACM) is an emerging and game-changing area of engineering and scientific research that integrates prognostics and health management concept and intelligent control. As leaders in this field, Impact Technologies and Georgia Institute of Technology, propose to build off a strong foundation of ACM research performed with NASA and DARPA in the past few years to both mature the applicability of ACM technology for real aerospace components and push the envelop on the capability and breadth of the technology itself. A prognostics-enhanced, three-tiered ACM architecture for critical aerospace systems has been conceptualized and demonstrated in Phase I. The proposed Phase II effort is focusing on utilizing prognostics at the higher levels of the control hierarchy and is introducing novel concepts to address the fault-tolerant control design at the middle level from the areas of model predictive control, system dynamic inversion, intelligent search techniques, and optimization / system identification algorithms for mission adaptation at the high level. Game theoretic notions are exploited to distribute optimally the available control authority between the components. An electromechanical flight actuator and a UAV platform will be utilized as testbeds for performance evaluation. Significant benefits are anticipated to NASA, DoD, and industry.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Impact Technologies, LLC	Supporting Organization	Industry	Rochester, New York

Primary U.S. Work Locations	
California	New York

Project Transitions

June 2009: Project Start

June 2011: Closed out

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.3 Power Management and Distribution
    - TX03.3.1 Management and Control